

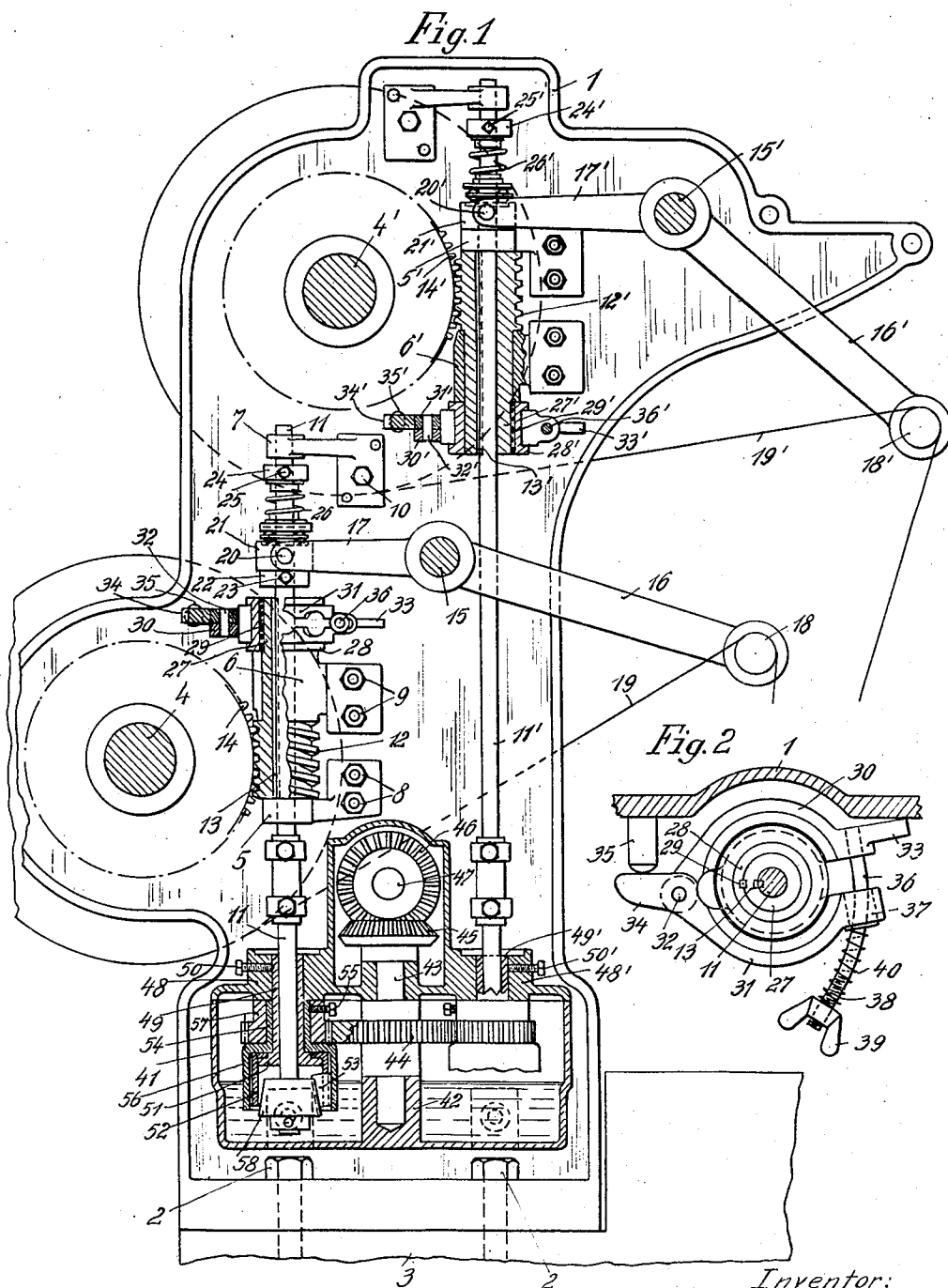
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THREAD DELIVERY DEVICE FOR WARP KNITTING MACHINES

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THREAD DELIVERY DEVICE FOR WARP
KNITTING MACHINES

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The present invention relates to a thread delivery device for high speed warp knitting machines.

Thread delivery devices for high speed warp knitting machines are known in which the thread operates on an axially displaceable shaft which is kinematically connected with the warp beam by means of a worm gear and on which is carried one part of a clamp roller coupling which by axial displacement of the shaft can, when desired, be brought into operative connection with the other part of the coupling which is constantly driven from the cam shaft of the machine. In thread delivery devices of this kind the driving device is disposed beneath the individual thread delivery devices on the frame of the machine in the immediate vicinity of the cam shaft. The delivery devices are operated by way of this common driving device from the cam shaft.

In this manner a reliable and rapid control of the drawing off of the thread is obtained, but the shafts carrying the worm gear drive for the warp beams are of rather considerable length. A common brake mechanism serves to brake the displaceable shafts. Due to the great length of the shafts oscillations are unavoidable and, moreover, the shafts are bent by the common brake acting upon them, so that the part of the clamp roller coupling mounted upon the shaft is unfavorably affected. Furthermore, the arrangement is such, that the brake mechanism must be lifted together with the shafts.

The object of the present invention is to obviate the above mentioned drawbacks.

According to the invention the clamp roller coupling is mounted in the upper part of the machine, whereby the length of the shafts is considerably reduced, so that a smoother and easy operation is obtained and oscillations or vibrations are obviated. Instead of a common brake, each shaft is provided with its own automatically operating brake. The brake drums form a unit with the worms and need no longer be lifted together with the shafts.

In the accompanying drawing one embodiment of the invention is shown by way of example.

In this drawing:

Fig. 1 is a part sectional side elevation of a device according to the invention looking from the interior of the machine and

Fig. 2 shows a detail view partly in section.

As shown in Fig. 1, brackets 1, one of which only is illustrated, are fixed by screws 2 to the frame 3 of the warp knitting machine. In the

bracket 1 warp beam shafts 4 and 4' are journaled. The bracket 1 carries bearings 5, 6 and 7 which are fixed by screws 8, 9 and 10 respectively. Journalled in the bearings 5, 6 and 7 and adapted to longitudinally slide therein is a shaft 11. Between the bearings 5 and 6 a worm 12 is mounted upon the shaft 11 which, as shown in Fig. 2, is fixed by a wedge 13 so as to rotate with the shaft 11 but allow movement of the latter in the longitudinal direction. The worm 12 engages a worm wheel 14 fixed upon the warp beam shaft 4.

A shaft 15 journalled in the bracket 1 carries a thread guide lever 16, 17 one arm 16 of which is provided at its free end with a roller 18. Over the latter the thread 19 delivered by the warp beam is guided to the working station of the machine not shown on the drawing. The other arm 17 of the thread guide lever 16, 17 is forked and pivoted to pins 20 of a ring 21 mounted upon the shaft 11. The lower face of the ring 21 bears against a ring 22 fixed to the shaft 11 by means of a screw 23. Near the upper bearing 7 for the shaft 11 a ring 24 is connected to the latter by means of a screw 25. A helical spring 26 surrounding the upper end of the shaft 11 bears against the rings 24 and 21. By adjusting the rings 21 and 24 the tension of the spring may be altered as desired.

The hub 27 of the worm 12 extends beyond the bearing 6 and carries a brake drum 28 fixed thereto by a wedge 29. Brake jaws 30 and 31 pivotally connected together by a pin 32 are arranged upon the brake drum 28. The brake jaw 30 is provided with a projection 33 which bears against the wall of the bracket 1. The brake jaw 31 is provided with a projection 34 bearing against a projection 35 fixed to the wall of the bracket 1. Near the free end of the brake jaw 30, a bent or curved rod 36 is fixed which extends through an enlarged bore 37 provided in the free end of the brake jaw 31. The free end of the bent rod 36 carries a thread 38 upon which a wing nut 39 is screwed. Between the wing nut 39 and the brake jaw 31 a helical spring 40 surrounds the rod 36. By adjusting the wing nut 39 the pressure of the brake jaws 30, 31 against the brake drum 28 may be regulated as desired. The projections 33 at the one hand and 34, 35 at the other hand prevent deflections and bendings of the shaft 11.

A second construction exactly similar to that described with the aid of reference characters 4—40 is provided at the bracket 1 and the individual parts of this construction are designated by

the same reference characters 4—40 each provided with an index. This second construction serves to control the warp beam shaft 4' in exactly the same manner as the first construction, described in detail, controls the warp beam shaft 4. The only difference between the two constructions is that in the first case the brake mechanism is mounted above the worm gear and in the second case below same and consequently the longer bearing 6 is provided above the shorter bearing 5, whereas the longer bearing 6' lies below the shorter bearing 5'.

Both shafts 11 and 11' extend downwardly into a housing 41 carried by the bracket 1. The lower end of each shaft 11 and 11' carries a clamp roller coupling to be described presently and both shafts are connected to a common drive mechanism. As the clamp roller couplings for the two shafts are of the same construction, the description of one of same is deemed sufficient.

In the centre of the housing 41, a bearing 42 is provided in which a vertical shaft 43 is journaled. The shaft 43 carries between its ends a gear wheel 44 and at its upper end a bevel gear wheel 45. The bevel gear wheel 45 engages with another bevel gear wheel 46 which is fixed to a horizontal shaft 47 driven from the cam shaft of the machine not shown in the drawing. The housing 41 is provided with two further bearings 48, 48' and in each of these bearings a sleeve 49, 49' is fixed by a set screw 50, 50' respectively.

The lower end of the sleeve 49 has a plate-like enlargement 51 from which is suspended a guide sleeve 52 for conical clamp rollers 53. Mounted on the sleeve 49 within the housing 41 is a sleeve 54 which is fixed by a set screw 55. The lower end 56 of the sleeve 54 is bell-shaped and to the cylindrical portion of this sleeve a gear wheel 57 is secured. The latter engages with the gear wheel 44 fixed to the shaft 43.

Carried on the lower end of the shaft 11 is a conically shaped member 58.

The housing 41 carrying the clamp roller coupling arrangement is constructed as a closed oil container, so that the couplings run in an oil bath.

The shaft 47 is continuously driven from the cam shaft of the machine, whereby the gear wheel 44 is also rotated by means of the bevel gear wheels 45, 46. By means of the gear wheel 44 the gear wheel 57 together with the bell-shaped sleeve 54, 56 are rotated and thereby the motion is transmitted to the clamp rollers 53 carried on the guide sleeve 52.

The arm 16 of the thread guide lever 16, 17 is held in the upward position by means of the spring 26, whereby the shaft 11, controlled by the lever 16, 17, is urged downwardly. The shaft 11' is, as indicated above, similarly controlled. The element 58 carried on the shaft 11 is thus only loosely in engagement with the clamp rollers 53, so that the latter are not capable of causing the element 58 to participate in the rotation.

If now warp threads are required, then under the action of the tightening thread 19 the arm 16 of the thread guide lever 16, 17 is depressed and the shaft 11 (or 11') is raised by means of the arm 17 of the thread guide lever 16, 17 against the action of the spring 26. Consequently the element 58 is also raised and comes into contact with the clamp rollers 53, so that the latter can now transmit their motion to the element 58, and thus to the shaft 11 (or 11'). By means of the worm 12 carried on the shaft 11 the motion is transmitted to the worm wheel 14 which rotates the warp beam

shaft 4 and thereby the warp beam causing the supply of thread.

As soon as the delivery of thread has been effected, the guide lever 16, 17 is swung by the spring 26, whereby the shaft 11 is lowered and the clamp rollers 53 cease to operate on the element 58.

By means of the brake mechanism 30—39 the shaft 11 is held against rotation except when driven and is prevented from overrunning which would result in automatic release of the coupling.

What I claim is:

1. A thread delivery device for high speed warp knitting machines, comprising a bracket fixed to the frame of the warp knitting machine, warp beam shafts journaled in said bracket, axially displaceable shafts rotatably mounted in bearings fixed to said bracket, means for shifting said axially displaceable shafts by the warp threads supplied to the machine, a worm wheel connected to each of said warp beam shafts, worms engaging with said worm wheels mounted upon said axially displaceable shafts, wedges slideably connecting said worms to said axially displaceable shafts, a brake mechanism mounted upon a hub portion of each worm extending beyond the bearing member, a casing fixed to said bracket, and a clamp roller coupling arrangement provided in said casing and adapted to transmit motion from the cam shaft of the warp knitting machine to said warp beam shafts.

2. A thread delivery device as set forth in claim 1 in which said means for shifting said axially displaceable shafts consist of a double-armed lever associated with each of said displaceable shafts and pivoted upon a bolt fixed to said bracket, one arm of said double-armed lever carrying a roller guiding the warp thread, while the other arm being pivoted to pins carried by a ring mounted upon said displaceable shaft, a helical spring, acting upon said double-armed lever and surrounding said displaceable shaft, bearing against said ring and a second ring adjustably fixed to said displaceable shaft at a distance from said first mentioned ring.

3. A thread delivery device as set forth in claim 1 in which said brake mechanism consist of a brake drum fixed to the hub of said worm and brake jaws linked together and surrounding said brake drum, one of said brake jaws being provided with a projection bearing against said bracket and carrying a curved rod, while the other of said jaws is provided with a projection bearing against a projection fixed to said bracket, the free end of said last mentioned brake jaw being provided with an enlarged bore for the passage of said curved rod, said curved rod carrying a thread upon which a wing nut is screwed, serving to more or less tension a helical spring surrounding said curved rod and bearing against said wing nut and said last mentioned brake jaw.

4. A thread delivery device for high speed warp knitting machines, comprising a bracket fixed to the frame of the warp knitting machine, warp beam shafts journaled in said bracket, axially displaceable shafts rotatably mounted in bearings fixed to said bracket, a double-armed lever associated with each of said axially displaceable shafts, pivots fixed to said bracket each carrying one of said double-armed levers, a roller, guiding the warp thread, provided at the free end of one arm of each double-armed lever, a fork provided at the other arm of each of said double-armed levers, a ring mounted on each of said axially displaceable shafts, pins provided on said ring

5 pivotally connected to said fork, a helical spring
 surrounding each of said axially displaceable
 shafts, a second ring adjustably fixed to each
 axially displaceable shaft at a distance from said
 first mentioned ring, said helical spring being ar-
 10 ranged between said two rings, a worm wheel
 fixed to each of said warp beam shafts, a worm
 mounted upon each of said axially displaceable
 shafts, a wedge slideably connecting said worm
 with said corresponding axially displaceable
 15 shaft, a brake drum fixed to the hub of each of
 the worms, brake jaws pivotally connected to-
 gether and surrounding said brake drum, a pro-
 jection provided at one of said brake jaws direct-
 ly bearing against said bracket, a curved rod fixed
 near the free end of said brake jaw, a projection
 20 provided at the other of said brake jaws, bearing
 against a projection provided at said bracket, an
 enlarged bore for the passage of said curved rod
 provided at the free end of said last mentioned
 brake jaw, a thread on the free end of said curved

rod, a wing nut screwed upon said thread, a
 helical spring surrounding said curved rod and
 bearing against said last mentioned brake jaw and
 said wing nut, a closed casing fixed to said brack-
 5 et, a conical part provided at the lower end of
 each of said axially displaceable shafts extend-
 ing into said casing, a sleeve connected to each
 of said axially displaceable shafts, an enlarge-
 ment at the lower end of this sleeve, a second
 sleeve suspended from said enlargement, conical
 10 clamp rollers carried by said depending second
 sleeve, a third sleeve, surrounding said second
 sleeve and fixed to said first sleeve, a gear wheel
 fixed to the cylindrical portion of said third
 sleeve, a vertical shaft mounted in said casing,
 15 a gear wheel fixed to said vertical shaft and en-
 gaging said gear wheel fixed to said third sleeve,
 and a bevel gear wheel fixed to the upper end
 of said vertical shaft engaging a bevel gear wheel
 driven by the warp knitting machine. 20

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